

Week 5: Analyzing Parametric Statistics

Key Points & Questions

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Association and Correlational Analysis (Liu et al., 2016; Polit & Beck, 2017; Schober, Boer, & Schwarte, 2018).

While frequently used interchangeably, association and correlation analysis are not equivalent to determining relationships between variables.

Association refers to any general relationship between two variables.

Correlation is the linear relationship between two variables as well as a measure of the strength of the relationship.

Correlation does not imply causation.

Informing Practice Change

Correlational analyses have been used for a very long time. Like all statistical analyses, they must be placed in context when deciding whether or not to use them to inform practice change. For example, consumers of evidence must continuously consider things such as overreliance on significance (p-values), sample size bias, and causal inference overreach because correlation does not imply causation (Hung, Bounsanga, & Voss, 2017; Schober et al., 2018).

Questions

1. As a DNP scholar, you are asked if there is anything that must be met in order for a statistical test to be deemed accurate. How would you respond?

When looking at statistics, there are requirements (or assumptions) that must be met in order for tests to be considered accurate (Polit & Beck, 2017). Any breach of these requirements (or assumptions) affects the interpretation of results as well as the conclusion of the research (Verma & Abdel-Salam, 2019).

2. From the Polit & Beck (2017) readings this week, what is the statistical assumption that differentiates parametric from nonparametric tests?

Parametric Assumptions:

1. Independent unbiased samples
2. Data normally distributed
3. Equal variances

Nonparametric Assumptions

1. Does not have a normal distribution
2. Small sample sizes acceptable
3. Can be used in all data types: nominal, ordinal, data with outliers

3. As a DNP scholar you are asked to briefly describe the difference between nonparametric and parametric statistics. How would you respond?

It is generally accepted that parametric tests are more powerful than non-parametric. Parametric tests can also be used to test a greater number of alternative hypotheses. However, there are circumstances where the requirements for parametric tests are breached and non-parametric tests are then more appropriate (Nahm, 2016; Polit & Beck, 2017).

4. As a DNP scholar, you are asked if we would be interested in clinical significance at the individual or group level. How would you respond and why?

While researchers tend to be more interested in clinical significance at the group level (also called practical significance), the focus for DNP scholars/clinicians is the individual patient (Polit & Beck, 2017). An easy way to remember the key difference is to recognize that researchers tend to be more interested in clinical significance at the group level (also called practical significance). Researchers analyze clinical significance at the group level via statistics such as effect size indices, confidence intervals, etc. Individual level clinical significance is all about the patient – using the best evidence available to address their specific needs (Polit & Beck, 2017; Polit, 2017).

5. What is it a DNP scholar should look for in statistical analyses that would impact the decision to use the evidence to address practice change?

You want to make sure that the correct statistical method was used to answer the research question. As discussed in Week 5, the best way to do this is by checking assumptions. Additionally, it's important that the data was collected appropriately. This increases the rigor of the statistical analysis (Kass et al., 2016; Polit & Beck, 2017).

6. As a DNP scholar, you are asked what a significantly well-designed study is. How would you respond?

Polit & Beck (2017) note a number of factors that contribute to a well-designed quantitative study:

- Clearly delineated research question
- Randomization
- Control for bias
- Proper sampling plan – representative of the population
- Appropriate sample size based on power analysis
- Clear eligibility criteria

- Use of reliable & valid instruments
- Use of appropriate statistics
- Disclosure of limitations
- Recommendations for clinical practice
- Recommendations for future research

7. In the Week 5 readings, Polit & Beck (2017) described the importance of having a benchmark when examining clinical significance. As a DNP scholar, how would you describe to a colleague what is meant by a benchmark?

Benchmark (also called threshold) is a value/result considered to be noteworthy or have clinical significance. This is oftentimes considered to be the minimum level of acceptability (Polit & Beck, 2017).

8. As a DNP scholar, you come across a study on your practice problem which shows significantly significant results. Do you automatically use the evidence to inform practice? Why or why not?

Polit & Beck (2017) note that just because a study reports statistical significance, it does not mean the evidence must be used to inform practice change. Statistical significance merely reflects that the findings of the study were most likely not due to chance.

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